PART V–THE STUDENT VOICE AT NABC 20

Student Voice Report[1]

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The *Student Voice* delegates attended the plenary sessions and breakout workshops and then met as a group to identify current and emerging issues relevant to the conference subject matter. They were provided with four questions to help focus their discussions.

How does agriculture serve both food and fuel markets?

- Agriculture provides the economic basis of most countries. It is a key player in delivering a country's economic potential.
- Many developed countries have a paternalistic attitude about how agriculture should deliver economic well-being in developing countries. This "big brother" attitude may be counterproductive in producing sustainable agriculture.
- The problem of satisfying the economic demand for fuel in an ecologically sound program has no clear answers. For example, environmental damage occurs in Canada—the United States' main supplier—in the extraction of petroleum.

[1]To increase graduate-student participation at NABC conferences, the *Student Voice at NABC* initiative was launched ahead of NABC 19. Feedback from those involved was positive, therefore the program was continued for NABC 20. Grants of up to $750 were offered to graduate students at NABC-member institutions (one student per institution) to offset travel and lodging expenses. Registration fees were waived for the grant winners. Registration fees were waived also for some graduate students from NABC-member institutions who agreed to act as recorders for the breakout sessions; they also participated in the *Student Voice* discussions. Information on the *Student Voice at NABC 21* is available at https://nabc21.usask.ca/

[2]This article is a synthesis of a verbal summary provided at NABC 20 by John Schumm and of a subsequent written summary by Mary Carol Frier, Sarah Kiger and Susanne Lipari (NABC).

- A century ago, biomass was the most common fuel in the United States. The original diesel engine ran on peanut oil and the first Model T was fueled with ethanol. Biomass could become a common feedstock once again. How will we sustain the economic and population progress we have made in the Age of Petroleum as we return to biomass as an energy source?
- Is the public ready for large-scale use of biomass? Biomass is less energy-dense than a gallon of oil and currently less convenient to use. Will public sentiment allow more biomass to be packaged as fuel?
- It is important to remind the public that the major cost of food is not the raw product, but the handling, marketing and distribution to bring it from the field to the table.
- Biomass is only one aspect of our emerging total energy portfolio, which includes nuclear and renewables such as wind and solar. New technologies could be 30% or more efficient at producing energy than those based on petroleum.
- Land-use changes may be necessary to produce biomass for food and fuel, but they should not be drastic and should be sustainably managed.
- Development of multipurpose biomass feedstocks—oilseeds for example—from which food, feed and fuel can be derived, may ease the transition.
- We need more knowledge about crop residues in the field, particularly corn stover. Residues from alternative crops may or may not support soil fertility more effectively than corn stover. Crop residue should be considered a crop, with its own harvest problems/opportunities and profitability *vis-à-vis* the grain or oilseed or forage harvest.
- Biofeedstocks will increase in price as demand for them increases
- Biotechnology could play a key role in maximizing extraction of food, feed and fuel from biomass.

What systems are needed to optimize the impact of biofuels on greenhouse gases?

- As important as greenhouse gases are, the major issue is reducing oil dependence. Conservation and waste-product usage are necessary. We generate huge amounts of waste that could be used to produce biofuels. Landfills could be thus minimized.
- Greenhouse-gas emission profiles are wrapped up in politics.
- We should consider converting the desert to crops before converting the rainforest to crops.
- Optimize the current cropping systems to increase sequestration of carbon dioxide.

- Modify microorganisms used to produce ethanol to emit less carbon dioxide.
- Reduce field fallow time by growing short-season crops or winter annuals.
- Increase crop intensity, perhaps by intercropping.
- Use public policy to create awareness of the factors that contribute to greenhouse-gas emissions, *e.g.* a carbon tax.

Much research has been done to improve agricultural systems for the production of major crops (such as no-till planting). Should similar research be done for biomass crops?

- Yes. Similar research could reduce production cost and/or increase yields of biomass crops. It could also upgrade these lands to higher-valued agricultural uses. This research could include: optimizing irrigation and harvesting techniques and maximizing efficiency of use of pesticides and fertilizer.
- Land used to grow dedicated biomass crops should not compete with land used to produce food, feed and fiber. Such crops should be grown on non-prime land.
- Biomass variety selections should be based on end use, whether biofuels or other bioproducts. Examples of variation among varieties include cellulose, hemicellulose and lignin contents, water-use efficiency, pest and disease resistance, and place in rotations affecting crop intensity.
- Use of seed-delivered pesticides could reduce production costs and improve quality of biomass crop yield. They could favorably affect water-use efficiency.
- Seed for biomass energy crops is in short supply and must be ramped up to meet demand.
- Perennial biomass crops require patience in establishment. For example, switchgrass requires a 3-year investment in land and management before it will yield a saleable crop. Management includes comprehensive weed control until the crop is established by the end of year 2.
- Growing perennial crops reduces farmer flexibility in response to year-to-year changes in market demands.

What comments do you have on the NABC White Paper, *Agriculture and Forestry for Energy, Chemicals and Materials: The Road Forward*[3]?

- It outlines how traditional and new biomass crops can provide chemicals, materials, fuels and polymers that will provide sustainable improvements in homeland security and economic growth.

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[3]http://nabc.cals.cornell.edu/pubs/The_Road_Forward.pdf

- Its main focus is on using new biomass crops and unused residues and developing new processes to produce the next generation of energy, chemicals and materials. More emphasis is needed on current sources of biomass.
- Technological, social, and economic issues resulting from transitioning to new biomass crops still need to be addressed.
- Government and academia must provide not only R&D for new feedstocks and technologies, but also information and education for farmers, industry, and the general public.
- Farmers should be better informed about the best production decisions for their land.
- While farmers should be encouraged to grow new biomass crops, we shouldn't allow traditional farmers to become disadvantaged. It would exacerbate the food-versus-fuel controversy.
- New feedstock development, more efficient conversion technologies, and efficient transportation infrastructure must be encouraged.
- The short-term focus should be on replacing petroleum as a source of fuels and chemicals. The longer term should focus on biobased chemicals and biomaterials, as well as new crops that provide health benefits.
- Policy is needed to facilitate decentralization of energy production.